Concepcion-Carrier Air conditioning Company Philippines

40 RM/RMS 008-034 Packaged Air-Handling Units

INSTALLATION MANUAL, START-UP & SERVICE INSTRUCTIONS

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SAFETY CONSIDERATIONS

Installation and servicing of air conditioning equipment can be hazardous due to system pressure and electrical components.

Only trained and qualified service personnel should install, repair or service air conditioning equipment.

Untrained personnel can perform basic maintenance functions such as cleaning coils and cleaning and replacing filters. All operations should be performed by trained service personnel.

Observe precautions in the literature, tags and labels attached to the unit .

- ❑ Follow all safety codes
- ❑ Wear safety glasses and gloves. Use quenching cloth and have fire extinguisher available for all brazing operations.
- ❑ Use care in handling, rigging and setting bulky equipment.

WARNING

Be sure all power is shut off before performing maintenance or service. More than one disconnect may be present.

PRE-INSTALLATION

Moving and Storage

To transfer unit from truck to storage site, use a fork truck. Do not stack units more than 2 high during storage. If unit is to be stored for more than 2 weeks before installation, choose level, dry storage site free from vibration. Do not remove plastic wrap or skid from unit until final installation.

Rigging

All 40RM/RMS Series units can be rigged by using the shipping skids. Units are shipped fully assembled. Do not remove shipping skids or protective covering until unit is ready for final placement; damage to bottom panels can result. Use slings and spreader bars as applicable to lift unit.

INSTALLATION

General

Allow 2-1/2 ft at front and side of unit for service clearance and airflow. For units equipped with an economizer, refer to accessory installation instructions for additional clearance requirements. Be sure floor, wall or ceiling support unit weight. See Table 1A, 1B, 1C, 1D for details.

Uncrating

Move unit as near as possible to final location before removing shipping skid.

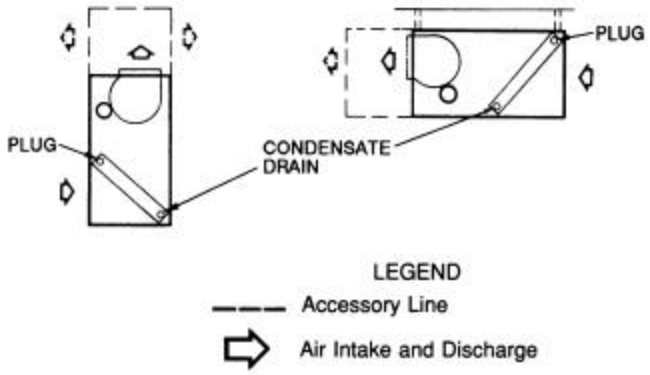
Remove plastic wrap. Examine unit for shipping damage. If shipping damage is evident, file claim with transportation agency. Remove base skid prior to actual installation.
Check nameplate information against available power supply and model number description.

UNIT POSITIONING

The unit can be mounted on the floor for vertical application with return air entering the face of the unit and supply air discharging vertically through the top of the unit. The unit can be also applied in a horizontal arrangement with return air entering horizontally and the supply air discharging horizontally. When applying the unit in a horizontal arrangement, ensure the condensate drain pan is located at the bottom center of the unit for adequate condensate disposal. See Fig. 1 for condensate connections for each position.

Typical positioning and alternate return air locations are shown in Fig. 1. Alternate return air locations can be used by moving the unit panel from the alternate return air location to the standard return air location.

Fig. 1 - Typical Unit Positioning



IMPORTANT

Do not attempt to install the unit with return air entering top panel of the unit. Condensate will not drain from unit.

Unit Isolation

Where extremely quiet operation is essential, install isolators between floor and base of unit or between ceiling and top section of unit.

Be sure that unit is level and adequately supported. Use channels at front and sides of unit for reference points when leveling.

Refrigerant and Chilled Water Piping Access

The 40RM/RMS series units come with stub-out pipes for easy refrigerant and chilled-water piping. These pipes are protruded outside the units for ready installation. The standard location of these pipes are at the right side. However, should alternate route of pipings be required there are also available knock-out holes at the opposite side of the unit.

Refrigerant Piping

See Tables 1A, 1B, 1D, 1E for refrigerant pipe connection sizes. For ease in brazing, it is recommended that all internal and external solder joints be made before unit is placed in final position.

The 40 RM direct-expansion coils have internal factory-installed thermostatic expansion valves (TXV's), distributors and nozzles for use with R-22. Knock-outs are provided in the unit corner posts. The sensor bulb capillary tubes must be routed from the TXVs inside the unit through one of the piping access holes. Clamp the TXV sensor bulb on a vertical position of the suction line, outside the unit. See Fig. 3.1 and 3.2.

40RM016-034 series evaporator have a face-split design. Ensure that lower circuit of the coil is first on/last off when connected to the condensing unit and /or system controls.

External TXV equalizer connections are provided and factory – brazed into the coil suction manifolds.

If suction line must be horizontal, clamp bulb onto suction line at least 45 degrees above the bottom at approximately the 4 o'clock or 8 o'clock position. See Fig. 2.

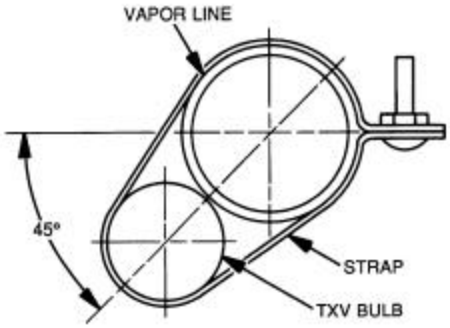


Fig. 2 – TXV Sensing Bulb Location

Note: The 8'o'clock position is shown above

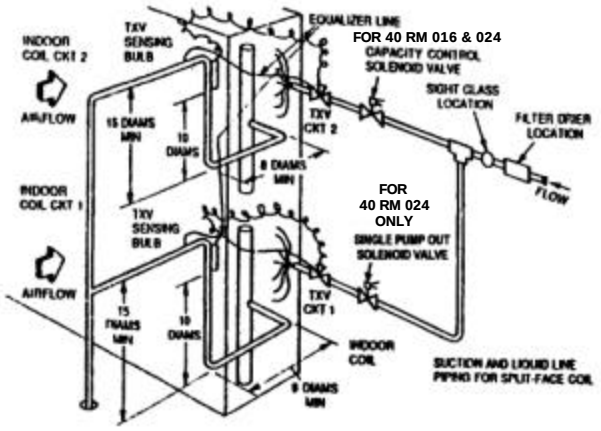


Fig. 3.1–Face-Split Coil Suction and Liquid Line Piping (Typical for 40RM 016/024)

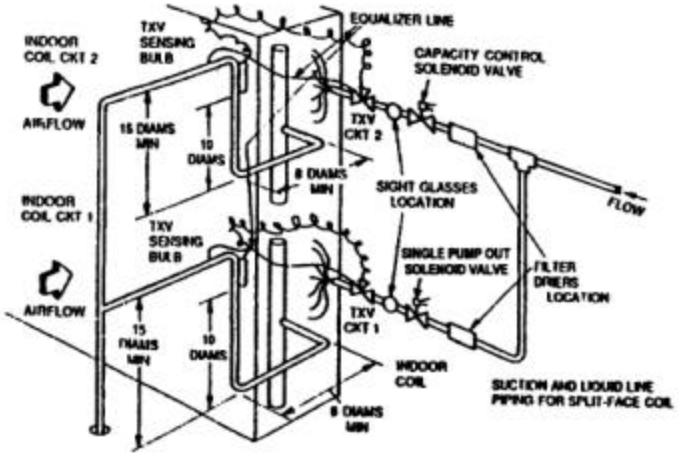


Fig. 3.2–Face-Split Coil Suction and Liquid Line Piping (Typical for 40RM 028/034)

IMPORTANT

NEVER attach the sensor to the suction manifold. DO NOT mount the sensor on a trapped portion of the suction line.

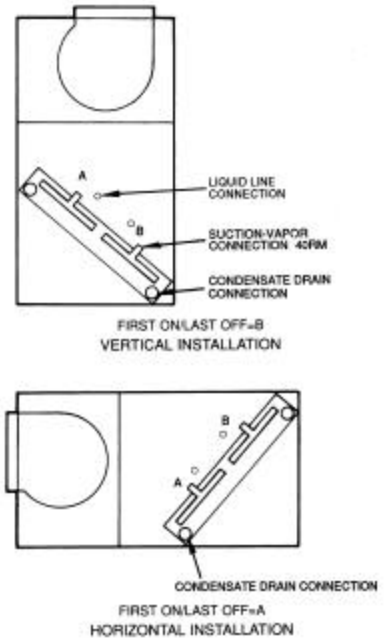


Fig. 4 – Typical Evaporator Coil Connections (40RM)

Chilled Water Piping

See Table 1B for chilled water connection sizes. For ease in piping connection it is recommended that all external fittings be made before the unit is placed in a final position.

Alternative holes are available on the opposite Post Corner should the alternate route of pipings are required. To design and install chilled water piping, consult Carrier System Design Manual. See Fig. 7 for an example of a typical installation. Recommended fittings are listed in Table 1B.

To access 40RMS coil vents and drains, remove the unit side panel over the coil header. Vent and drain plugs are on the top and bottom of the header, respectively.

Condensate Drain

Install a trapped condensate drain line to unit connection as shown in Fig. 5 . Some areas may require an adapter to connect to either galvanized steel or copper pipe.

Note: A trap must be installed in the condensate drain line to ensure that the static pressure of fans is balanced with the water column in the drain line and that the condensate can drain completely from pan. Without a trap, air can be drawn up drain line until water level in condensate pan becomes equal to static pressure created by fans, preventing complete drainage. Conditions will worsen as filters become dirty.

Install clean-out plugs in traps. Pitch drain line downward to an open floor drain or sump. Provide service clearance around drain line to permit removal of panels. Observe all local sanitary codes.

As shipped, the unit's condensate drain pan is not sloped towards the drain connection. The pan slope must be changed to pitch towards the side of the unit with the drain connection. See Fig. 6. Loosen the 2 screws next to the drain outlet at both ends of the unit, push drain pan down in the slots near the drain connections, and up in the slots on the opposite end. Retighten screws. The pan should have a pitch of at least ¼ in. over its length toward the drain connection.

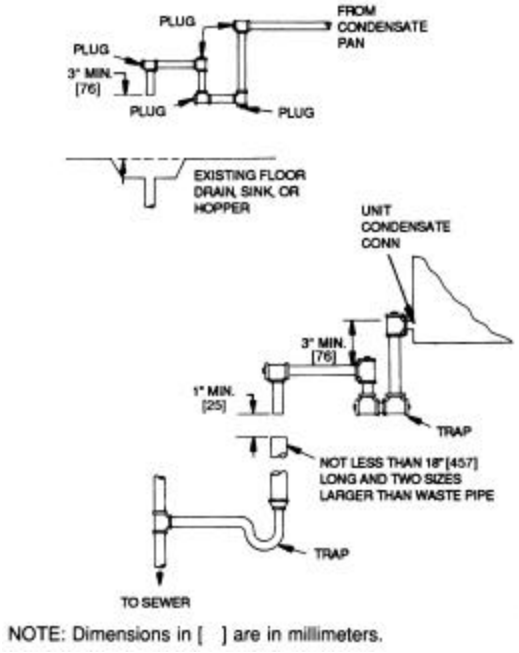


Fig. 5 – Condensate Drains

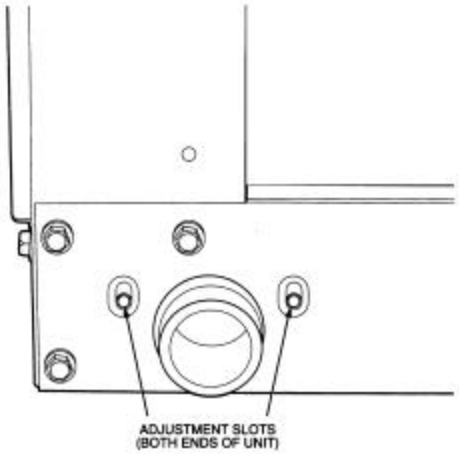
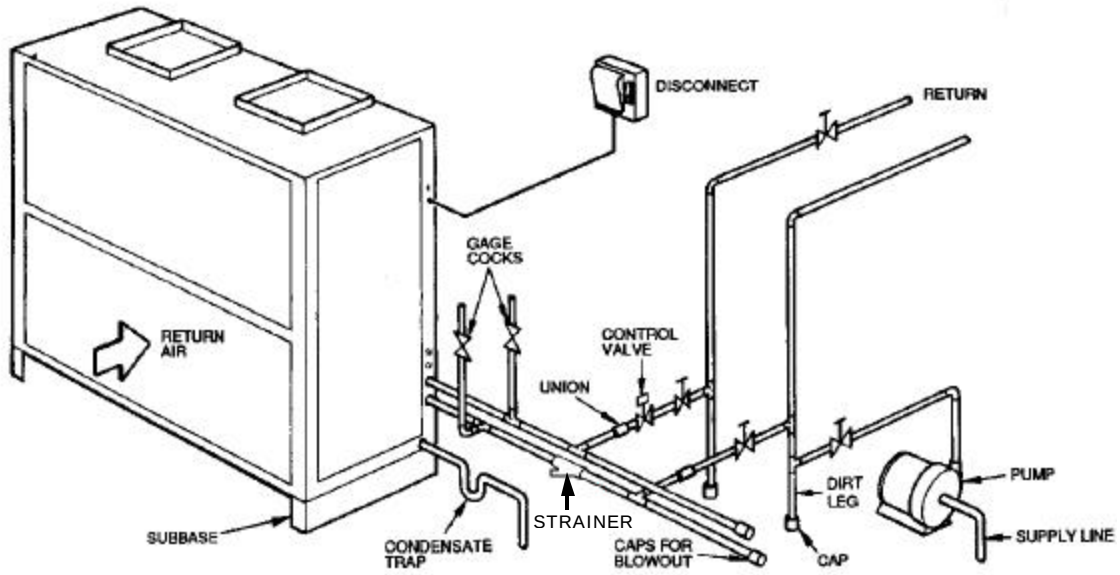


Fig. 6 – Drain Slope Adjustments

Fig. 7 - Typical 40RMS Chilled Water Piping



Fan Motor and Drives

Motor and drive packages are factory-installed in all units. The standard motor and drive packages consist of the following items :

1 – fan motor
1 – adjustable motor pulley
1 – fan pulley
1 – fan belt for 008-024 sizes; 2 for 028-034 sizes

For instructions on changing fan rotation, changing the drive speeds and adjusting drives. Please refer to Fan Rotation Section.

Power Supply and Wiring

Check the unit data plate to ensure that available power supply matches electrical characteristics of the unit. Provide a disconnect switch of size required to provide adequate fan motor starting current. See Table 4A for unit electrical data.

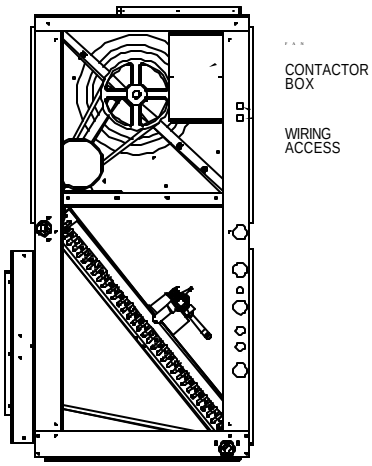


Fig. 8 - Wiring and Service Access (Side Panel Removed)

Fan motors are factory installed on all units. Indoor-fan contactors are located in the fan contactor box behind the side access panel. Wire the thermostat according to the label diagram. If the air handler is a part of the split system, complete the wiring from the condensing unit to the thermostat.

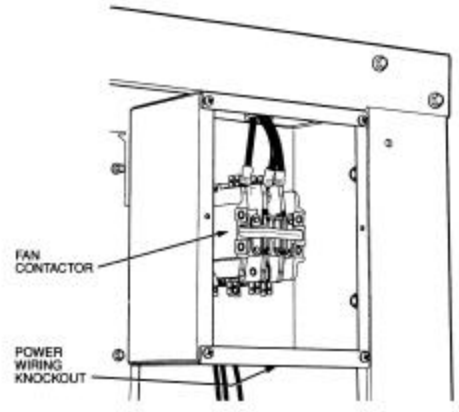


Fig. 9 - Fan Contactor Box (Cover Removed)

Connecting Ductwork

Refer to Carrier System Design Manual for the recommended design and layout of ductwork. Fig. 10 shows recommended duct connection to units with two fans.

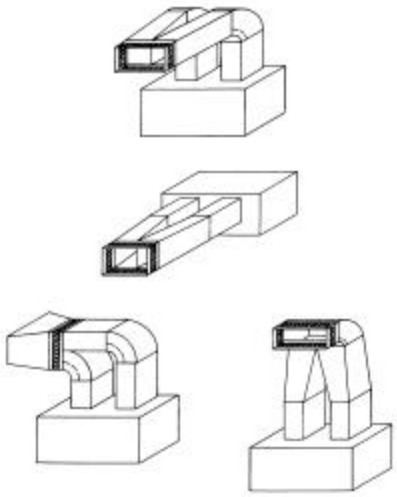


Fig. 10 - Typical Fan Discharge Connections for Multiple Fan Units

START UP

Before starting the unit, check the following and correct as necessary:

- ❑ Is the unit solidly supported ?
- ❑ Is fan adjusted for speed and pulley alignment ?
- ❑ Are pulleys, motors and bearings securely mounted ?
- ❑ Is condensate drain pan pitched for correct drainage ?
- ❑ Are coil baffles tight against coil to prevent air bypass ?
- ❑ Are all panels securely fastened ?
- ❑ Are all electrical connections correct and tight ?

SERVICE

Inspection and maintenance should be performed at regular intervals and should include the following :

- ❑ Complete cleaning of cabinet, fan wheel, cooling coil, condensate pan and drain and return air grille (if present).
- ❑ Inspection of panels and sealing unit against air leakage.
- ❑ Adjustment of fan motor , belt, bearings and wheels.
- ❑ Cleaning or replacing of filters.
- ❑ Testing for cooling system leaks.
- ❑ Checking of all electrical connections.

Most unit service can be performed by removing one or both of the unit's side panels. Coil cleaning or removal or insulation cleaning may require removal of rear, top or bottom panel, depending on the unit's orientation. When service is completed, replace unit panels.

Panels

Panels are fastened to unit frame with sheet metal screws. Fan coil and coil compartment must be sealed tightly after service to prevent air from bypassing the cooling coil.

Fan Motor Lubrication

Fan motor supplied with unit is permanently lubricated and requires no further lubrication.

Fan Shaft Bearings

Bearings on 008 – 034 size units have pillow-block bearings (Fig. 11) that must be lubricated with suitable bearing grease every 3 months.

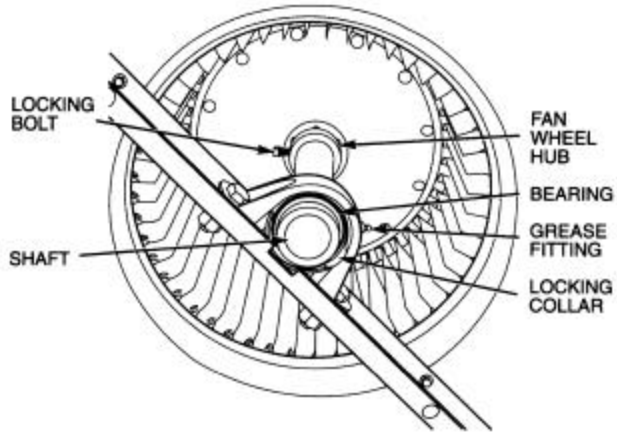


Fig. 11 - Fan Shaft, Bearings and Fan Wheel

Centering Fan Wheel

If fan and fan shaft assembly are not properly centered, blades may scrape against scroll or may create an objectionable whistling noise. It may be necessary to adjust individual fan wheels or move the entire fan shaft. See the following sections.

Fan Shaft Position Adjustment

Loosen setscrew or locking collar of each fan shaft bearing. Slide shaft into correct position and replace locking collar (Fig. 12). To replace locking collar, push collar up against inner face of the bearing. Turn collar in direction of the fan rotation until tight, and tighten setscrew. Tightening locking collar in direction of fan rotation results in further tightening of collar should setscrew work itself loose.

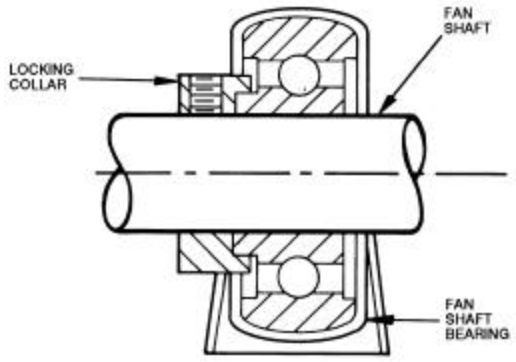


Fig. 12 - Fan Shaft Bearing

Individual Fan Wheel Adjustment

Loosen the two locking bolts holding the fan wheel hub to the shaft. Position fan wheel in center of the fan housing and tighten locking bolts. Clearance between wheel and housing should be the same on both sides.

Fan Belts

Motor mounting plate and motor support angles are slotted to permit both vertical and horizontal adjustments. Adjust belt(s) for correct deflection by loosening motor mounting bolts, moving motor/plate assembly forward or back and tightening bolts. Press down on belt with one finger midway between fan and motor pulleys to check deflection. For units with motor sizes up to and including 3.0 hp (2.3Kw), correct deflection is 3/16 in. (4.8 mm). For larger motor sizes, correct deflection is 1/8 in (3.2 mm). See Fig. 13

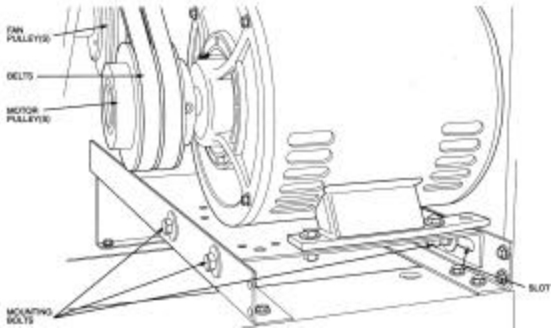


Fig. 13 - Fan Motor Mounting

If complete belt replacement is required during servicing , loosen the motor plate mounting bolts, move motor/plate assembly towards the fan pulley and pull the belt(s) off the pulleys. Reverse the procedure with new bolts and readjust deflection.

Fan Rotation

Correct fan rotation with respect to fan outlet is shown in Fig. 14.

To reverse the direction of rotation of a 3-phase fan motor, interchange any 2 of the power leads. Refer to the connection diagram on the inside of the motor terminal box cover for proper reversing procedure.

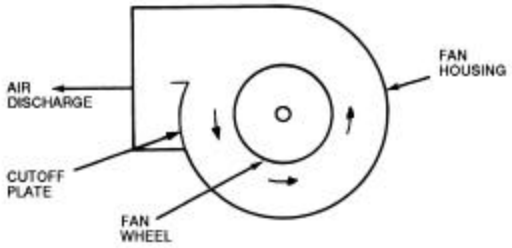


Fig. 14 - Fan Rotation

Fan Pulley Alignment

Align as follows :

1. Loosen setscrews on pulleys.
2. Align pulleys visually and tighten setscrews on fan pulleys to lock it in place.
3. Use the methods shown in Fig. 15. To check proper pulley alignment.
4. If pulleys are not in correct alignment, loosen the motor holddown bolts and slide the motor axially until the pulleys are aligned.
5. Tighten the motor holddown bolts.

Pulley and Drive Adjustments

To obtain desired fan speed, refer to fan motor and drive data and adjust pulley as follows:

1. Remove belt from fan motor pulley after loosening motor from motor base.
2. Loosen setscrew in moveable flange of pulley. Screw moveable flange toward fixed flange to increase the fan speed and away from fixed flange to reduce speed. Before tightening setscrew, make certain that setscrew is over nearest flat surface of pulley hub.

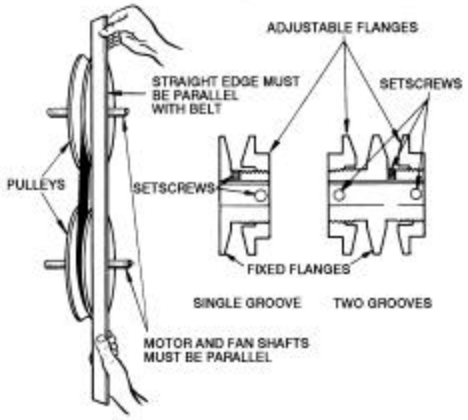


Fig. 15 - Fan Pulley Adjustments

CAUTION
Increasing fan speed produces a greater load on motor. Do not exceed rated capacity of motor.

Condensate Drains
Keep condensate drains free of dirt and foreign matter.

Return-Air Filters
Refer to Replacing Filters Section for filter accessibility and removal. Replace with clean filters of the sizes listed in Tables 1A – 1D.

Coil Removal
Remove return-air filters. Remove any heavy dirt that may have accumulated on underside of the coil. Coil can be cleaned more easily with a stiff brush, vacuum cleaner or compressed air when coil is dry. If coil is wet or if water is to be used for cleaning, guard against splashing water on electrical components or damaging surrounding area. Clean coil baffles as applicable and check for tight fit to be sure air does not bypass coil.

Cleaning Insulation
The insulation contains an immobilized antimicrobial agent that helps prevent the growth of bacteria and fungi. It is recommended to clean the surface of the insulation after every cleaning of the coil by wiping it with water-soap solution..

Replacing Filters
Filters can be removed and installed from either side of the unit.
1. Remove the filter side cover.
2. Remove old filters by sliding them out one by one from the filter track.
3. Reverse the procedure to install new filters.

CAUTION
Do not operate unit without air filters.

*Motors are designed for satisfactory operation of nominal voltages shown. Voltages should not exceed the limits shown in the Voltage Limits column.

Unbalanced 3-Phase Supply Voltage
Never operate a motor where a phase imbalance in supply voltage is greater than 2 %. Use the following formula to determine the percentage of voltage imbalance.

% Voltage Imbalance

$$= \frac{\text{max. voltage deviation from ave. voltage} \times 100}{\text{average voltage}}$$

Example:
Supply voltage : 230 – 3 – 60

Voltage Measurements:
Phase A-B = 226
Phase B-C = 233
Phase C-A = 228

$$\text{Average Voltage} = \frac{226 + 233 + 228}{3}$$

Average Voltage = 229

Determine maximum deviation from average voltage.
(AB) 229 – 226 = 3
(BC) 233 – 229 = 4
(CA) 229 – 228 = 1
Maximum deviation is 4 V.
Determine % Voltage Imbalance.
= 100 x 4 / 229 = 1.75 %

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT
If the supply voltage phase imbalance is more than 2% at main circuit breaker, contact your utility company.

TABLE 1A - 40 RM PHYSICAL DATA - ENGLISH

UNIT 4O RM	008	012	016	024	028	034
NOMINAL CAPACITY (TONS)	7.5	10	15	20	25	30
OPERATING WEIGHT (lb)						
Base Unit with TXV	385	405	685	690	1020	1030
FANS						
Qty… Diam. (in)	1… 15		2… 15		2… 18	
Nominal Air Flow (cfm)	3000	4000	6000	8000	10000	12000
Air flow Range (cfm)	2250-	3000-	4500-	6000-	7500-	9000-
	3750	5000	7500	10000	12500	15000
Nominal Motor Hp (Standard Motor)						
208/230-3-60 and 460-3-60	1.0	2.0	3.0		7.5	7.5
Motor Speed (rpm)						
208/230-3-60 and 460-3-60	1725				1745	
REFRIGERANT	R 22					
Operating Charge (lb) (approx per circuit)*	3.0	3.0	2.5/2.5	3.5/3.5	4.5/4.5	5.0/5.0
DIRECT EXPANSION COIL	Enhanced Copper Tubes, Aluminum Sine-WaveFins					
Max Working Pressure (psig)	435					
Face Area (sq ft)	8.33	10.0	17.67	19.88	24.86	29.83
No. of Splits	1		2			
No. of Circuits per Split	15	18	12	13	15	18
Split Type… Percentage	-		Face… 50/50			
Rows… Fins / in	3…15	3…17	3…15	3…17	3…15	
PIPING CONNECTIONS (Qty/Size, in)						
DX Coil - Suction (ODF)	1…1-1/8		2…1-1/8		2…1-3/8	
DX Coil - Liquid Refrigerant (ODF)	1…5/8		2…5/8			
Condensate	1… 1-1/4 ODF					
FILTERS	Washable - Factory Supplied					
Quantity… Size (in)	1…16 x 20 x 2		2…16 x 20 x 2		1…25 x 13 x 2	
	1…25 x 20 x 2		2…25 x 20 x 2		4…25 x 20 x 2	
Access Location	Either Side					

LEGEND

TXV - Thermostatic Expansion Valve

* Units are shipped without refrigerant charge.

TABLE 1B - 40 RMS PHYSICAL DATA - ENGLISH

UNIT 4O RMS	008	012	016	024	028	034
NOMINAL CAPACITY (TONS)	7.5	10	15	20	25	30
OPERATING WEIGHT (lb)	390	391	677	683	1035	1042
FANS						
Qty… Diam. (in)	1… 15		2… 15		2… 18	
Nominal Air Flow (cfm)	3000	4000	6000	8000	10000	12000
Air flow Range (cfm)	2250-	3000-	4500-	6000-	7500-	9000-
	3750	5000	7500	10000	12500	15000
Nominal Motor Hp (Standard Motor)						
208/230-3-60 and 460-3-60	1.0	2.0	3.0		7.5	7.5
Motor Speed (rpm)						
208/230-3-60 and 460-3-60	1725				1745	
CHILLED WATER COIL	Enhanced Copper Tubes, Aluminum Sine-WaveFins					
Max Working Pressure (psig)	150					
Face Area (sq ft) - Upper	8.3	9.8	8.3	11.0	12.4	15.5
Face Area (sq ft) - Lower	-		8.3	8.3	12.4	12.4
Rows… Fins / in	3…15					
PIPING CONNECTIONS (Qty/Size, in)						
Chilled Water - In	1…1-1/2 ODM		1…1-1/2 ODM		1…2 ODM	
Chilled Water - Out	1…1-1/2 ODM		1…1-1/2 ODM		1…2 ODM	
Condensate	2… 1-1/4 ODF					
FILTERS	Washable - Factory Supplied					
Quantity… Size (in)	1…16 x 20 x 2		2…16 x 20 x 2		1…25 x 13 x 2	
	1…25 x 20 x 2		2…25 x 20 x 2		4…25 x 20 x 2	
Access Location	Either Side					

TABLE 4A - ELECTRICAL DATA, STANDARD MOTORS

UNIT	V*-PH-HZ	VOLTAGE LIMITS	FAN MOTOR		POWER SUPPLY	
			HP	FLA	MINIMUM CIRCUIT AMPS	MOCP
40RM 008	208/230 - 3 - 60	187-253	1.0	3.3	4.1	15
40RMS 008	460 - 3 - 60	414 - 528		1.7	2.1	15
40RM 012	208/230 - 3 - 60	187 - 253	2.0	6.3	7.9	15
40RMS 012	460 - 3 - 60	414 - 528		3.2	4.0	15
40 RM 016	208/230 - 3 - 60	187 - 253	3.0	8.8	11.0	15
40 RMS 016	460 - 3 - 60	414 - 528		4.49	5.6	15
40 RM 024	208/230 - 3 - 60	187 - 253	3.0	8.8	11.0	15
40 RMS 024	460 - 3 - 60	414 - 528		4.49	5.6	15
40 RM 028	208/230 - 3 - 60	187 - 253	7.5	22.0/21.0	27.5/26.3	45/45
40 RMS 028	460 - 3 - 60	414 - 528		10.5	13.1	20
40 RM 034	208/230 - 3 - 60	187 - 253	7.5	22.0/21.0	27.5/26.3	45/45
40 RMS 034	460 - 3 - 60	414 - 528		10.5	13.1	20

TABLE 4B - ELECTRICAL DATA, ALTERNATE MOTORS

UNIT	V*-PH-HZ	VOLTAGE LIMITS	FAN MOTOR		POWER SUPPLY	
			HP	FLA	MINIMUM CIRCUIT AMPS	MOCP
40RM 008	208/230 - 3 - 60	187 - 253	2.0	6.3	7.9	15
40RMS 008				3.2	4.0	15
40RM 012	208/230 - 3 - 60	187 - 253	3.0	8.8	11.0	15
40RMS 012				4.49	5.6	15
40 RM 016	208/230 - 3 - 60	187 - 253	5.0	15.2/14.4	19.9/18.0	30/30
40 RMS 016	460 - 3 - 60	414 - 528		7.2	9.0	15
40 RM 024	208/230 - 3 - 60	187 - 253	5.0	15.2/14.4	19.9/18.0	30/30
40 RMS 024	460 - 3 - 60	414 - 528		7.2	9.0	15
40 RM 028	208/230 - 3 - 60	187 - 253	10.0	26.4/25.0	33.0/31.3	55/55
40 RMS 028	460 - 3 - 60	414 - 528		12.5	15.6	25

LEGEND :

FLA	Full Load Amps
MOCP	Maximum Overcurrent Protection, Amps (Circuit Breaker)

Note: For 3-phase motors, use circuit breakers with common trip bar to prevent single pahsing defect.

TABLE 5A - FAN MOTOR DATA, STANDARD MOTOR

UNIT	40 RM 008 40 RMS 008	40 RM 012 40 RMS 012	40 RM 016 40RMS 016	40RM 024 40 RMS 024	40RM 028 40RMS 028	40 RM 034 40RMS 034
208/230 - 3 - 60 and 460 - 3 - 60						
Speed (rpm)	1725				1745	
Hp	1.0	2.0	3.0		7.5	
Frame	56 Y (NEMA)				132S(IEC)	
Shaft Dia.	7/8"	7/8"	7/8"	7/8"	38 mm	

TABLE 5B - FAN MOTOR DATA, ALTERNATE MOTOR

UNIT	40 RM 008 40 RMS 008	40 RM 012 40 RMS 012	40 RM 016 40RMS 016	40RM 024 40 RMS 024	40RM 028 40RMS 028	40 RM 034 40RMS 034
208/230 - 3 - 60 and 460 - 3 - 60						
Speed (rpm)	1725		1745			
Hp	2.0	3.0	5.0		10	
Frame	56 Y (NEMA)		S184T (NEMA)		132M (IEC)	
Shaft Dia.	7/8"	7/8"	1-1/8"	1-1/8"	38 mm	

TABLE - Standard Drive Data, 60 Hz - English

UNIT	40RM 40 RMS 008	40RM 40 RMS 012	40RM 40 RMS 016	40RM 40 RMS 024	40RM 40 RMS 028	40RM 40 RMS 034
MOTOR DRIVE						
Motor Pulley Pitch Diameter (in)	3.4 - 4.3	3.4 - 4.3	3.4 - 4.3	3.4 - 4.3	3.9 - 5.1	3.9 - 5.1
Pulley Factory Setting Full Turns Open	5	5	4	4	4	4
FAN DRIVE						
Pulley Pitch Diameter (in)	8.8	8.8	10	10	10	10
Pulley Bore (in)	1	1	1	1	1 15/16	1 15/16
Belt No. - Section	1 - A41	1 - A41	1 - B40	1 - B40	2 - B39	2 - B39
FAN SPEEDS (rpm)						
Factory Setting	647	764	632	771	752	752
Range	549 - 745	666 - 863	537 - 728	679 - 863	682 - 841	674 - 831
Max. Allowable Speed (rpm)	1200	1200	1200	1200	1100	1100
Max. Full Turns From Closed Position	5.5	5.5	5.5	5.5	5.5	5.5

TABLE - Medium Static Drive Data, 60 Hz - English

UNIT	40RM 40 RMS 008	40RM 40 RMS 012	40RM 40 RMS 016	40RM 40 RMS 024	40RM 40 RMS 028	40RM 40 RMS 034
MOTOR DRIVE						
Motor Pulley Pitch Diameter (in)	3.4 -4.3	3.4 - 4.3	3.4 -4.3	3.4 -4.3	3.9-5.1	3.9-5.1
Pulley Factory Setting Full Turns Open	5	5	4	4	4	4
FAN DRIVE						
Pulley Pitch Diameter (in)	8.8	8.8	10	10	10	10
Pulley Bore (in)	1	1	1	1	1 15/16	1 15/16
Belt No. - Section	1 - A41	1 - A41	1 - B40	1 - B40	2 - B39	2 - B39
FAN SPEEDS (rpm)						
Factory Setting	841	841	842	881	881	881
Range	733 - 949	733 - 949	742 - 943	798 - 984	798 - 984	798 - 984
Max. Allowable Speed (rpm)	1200	1200	1200	1200	1100	1100
Max. Full Turns From Closed Position	5.5	5.5	5.5	5.5	5.5	5.5

TABLE - High Static Drive Data, 60 Hz - English

UNIT	40RM 40 RMS 008	40RM 40 RMS 012	40RM 40 RMS 016	40RM 40 RMS 024	40RM 40 RMS 028	40RM 40 RMS 034
MOTOR DRIVE						
Motor Pulley Pitch Diameter (in)	3.4 -4.3	3.4 - 4.3	3.4 -4.3	3.4 -4.3	3.9-5.1	3.9-5.1
Pulley Factory Setting Full Turns Open	5	5	4	4	4	4
FAN DRIVE						
Pulley Pitch Diameter (in)	6.0*	6.0	7.9	7.4	8.6	8.6
Pulley Bore (in)	1	1	1	1	1 15/16	1 15/16
Belt No. - Section	1 - A41	1 - A41	1 - B40	1 - B40	2 - B39	2 - B39
FAN SPEEDS (rpm)						
Factory Setting	1121	1121	1060	1118	1024	1024
Range	978 - 1200**	978 - 1200*	950 - 1171	1014 - 1200*	873 - 1075	873 - 1075
Max. Allowable Speed (rpm)	1200	1200	1200	1200	1100	1100
Max. Full Turns From Closed Position	5.5	5.5	5.5	5.5	5.5	5.5

** It is possible to adjust drive so that the fan speed exceeds maximum allowable. DO NOT EXCEED 1200 rpm.

Table - Fan Performance Data - 0.0 - 0.6 in. wg. ESP - English

UNIT	AIRFLOW	Static Pressure							
		0.0		0.2		0.4		0.6	
	(CFM)	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
40RM 40RMS 008	2,250	359	0.32	472	0.44	560	0.55	634	0.65
	2,600	415	0.45	516	0.57	599	0.68	669	0.79
	3,000	478	0.62	569	0.75	645	0.86	712	0.98
	3,400	542	0.82	624	0.95	695	1.08	758	1.20
	3,750	598	1.03	673	1.17	740	1.29	800	1.42
40RM 40RMS 012	3,000	444	0.58	541	0.71	621	0.83	691	0.94
	3,500	518	0.82	604	0.95	677	1.08	742	1.20
	4,000	592	1.11	669	1.25	736	1.38	797	1.51
	4,500	666	1.44	735	1.59	797	1.72	854	1.86
	5,000	740	1.83	803	1.98	861	2.12	914	2.26
40RM 40RMS 016	4,500	391	0.51	495	0.75	581	1.00	657	1.25
	5,300	460	0.80	551	1.08	629	1.35	700	1.63
	6,000	521	1.13	602	1.43	675	1.73	741	2.04
	6,800	590	1.60	663	1.93	730	2.26	791	2.59
	7,500	651	2.10	718	2.45	779	2.81	837	3.16
40RM 40RMS 024	6,000	503	1.07	587	1.37	661	1.67	727	1.97
	7,000	586	1.64	660	1.98	726	2.31	787	2.65
	8,000	670	2.37	735	2.74	795	3.12	851	3.49
	9,000	754	3.28	812	3.69	867	4.09	918	4.50
	10,000	838	4.39	891	4.83	941	5.27	988	5.70
40RM 40RMS 028	7,500	412	1.15	492	1.53	568	2.00	640	2.56
	8,750	481	1.76	550	2.17	616	2.66	680	3.22
	10,000	549	2.55	610	2.99	669	3.50	726	4.07
	11,250	618	3.52	672	4.00	725	4.53	777	5.12
	12,500	687	4.71	735	5.22	783	5.78	830	6.38
40RM 40RMS 034	9,000	471	1.78	539	2.17	604	2.63	667	3.17
	10,500	550	2.72	608	3.15	665	3.64	720	4.18
	12,000	628	3.93	679	4.40	730	4.92	779	5.48
	13,500	707	5.44	752	5.94	797	6.49	841	7.08
	15,000	785	7.27	826	7.81	867	8.39	907	9.01

Legend

BHP -Brake Horsepower Input to Fan
ESP -External Static Pressure

Notes:

1. Maximum allowable fan speed is 1100 rpm for unit sizes 028 and 034; 1200 for all other sizes.
2. Fan performance is based on deductions for wet coil, clean 2-in. filters, and unit casing. See table for factory-supplied filter pressure drop.

Table - Fan Performance Data - 0.8 - 1.4 in. wg. ESP - English

UNIT	AIRFLOW	0.8		1.0		1.2		1.4	
	(CFM)	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
40RM 40RMS 008	2,250	700	0.75	759	0.86	814	0.96	865	1.06
	2,600	732	0.90	790	1.01	843	1.11	893	1.22
	3,000	773	1.09	828	1.20	879	1.32	928	1.43
	3,400	815	1.31	869	1.43	918	1.55	965	1.66
	3,750	855	1.60	906	1.66	954	1.78	1000	1.90
40RM 40RMS 012	3,000	753	1.05	809	1.17	862	1.28	911	1.39
	3,500	801	1.32	855	1.44	906	1.56	953	1.67
	4,000	853	1.63	904	1.75	953	1.88	999	2.00
	4,500	907	1.99	956	2.12	1003	2.24	1047	2.37
	5,000	964	2.39	1010	2.53	1055	2.66	1097	2.79
40RM 40RMS 016	4,500	725	1.50	787	1.76	845	2.02	899	2.29
	5,300	764	1.91	823	2.20	878	2.48	930	2.78
	6,000	801	2.34	858	2.65	911	2.96	961	3.28
	6,800	847	2.92	901	3.26	951	3.60	999	3.94
	7,500	890	3.52	941	3.88	990	4.24	1036	4.60
40RM 40RMS 024	6,000	789	2.28	846	2.59	900	2.90	950	3.21
	7,000	844	2.99	898	3.33	948	3.67	996	4.02
	8,000	904	3.86	954	4.23	1001	4.61	1047	4.99
	9,000	967	4.90	1014	5.31	1059	5.72	1102	6.13
	10,000	1034	6.14	1077	6.85	1120	7.02	1160	7.46
40RM 40RMS 028	7,500	710	3.22	776	3.98	840	4.83	903	5.79
	8,750	742	3.86	802	4.58	860	5.38	917	6.26
	10,000	782	4.70	836	5.40	889	6.17	941	7.01
	11,250	827	5.76	876	6.45	925	7.21	972	8.02
	12,500	876	7.04	922	7.74	966	8.49	1010	9.29
40RM 40RMS 034	9,000	728	3.78	788	4.46	845	5.22	901	6.07
	10,500	774	4.79	827	5.45	878	6.18	928	6.98
	12,000	827	6.09	874	6.76	921	7.47	966	8.24
	13,500	885	7.71	928	8.38	970	9.10	1011	9.86
	15,000	947	9.66	986	10.35	1024	11.07	1062	11.84

Legend

BHP -Brake Horsepower Input to Fan
ESP -External Static Pressure

Notes:

1. Maximum allowable fan speed is 1100 rpm for unit sizes 028 and 034; 1200 for all other sizes.
2. Fan performance is based on deductions for wet coil, clean 2-in. filters, and unit casing. See table for factory-supplied filter pressure drop.

Table - Fan Performance Data - 1.6-2.4 in. wg. ESP - English

UNIT	AIRFLOW	1.6		1.8		2.0		2.2		2.
	(CFM)	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM
	2,250	913	1.16	958	1.27	1001	1.37	1042	1.47	-
40RM	2,600	940	1.33	984	1.43	1027	1.54	1067	1.65	-
40RMS	3,000	973	1.54	1017	1.65	1058	1.76	1098	1.87	-
008	3,400	1010	1.78	1052	1.89	1092	2.00	1131	2.12	-
	3,750	1043	2.02	1084	2.13	1124	2.25	1162	2.37	-
	3,000	958	1.5	1002	1.61	1044	1.72	1084	1.83	1123
40RM	3,500	998	1.79	1041	1.90	1082	2.02	1122	2.13	1159
40RMS	4,000	1042	2.12	1084	2.24	1124	2.36	1162	2.48	1199
012	4,500	1089	2.50	1129	2.62	1168	2.74	-	-	-
	5,000	1138	2.92	1177	3.05	-	-	-	-	-
	4,500	951	2.56	999	2.84	1046	3.12	1091	3.41	1133
40RM	5,300	980	3.08	1027	3.38	1072	3.68	1116	3.99	1157
40RMS	6,000	1009	3.60	1055	3.92	1098	4.24	1141	4.57	1181
016	6,800	1045	4.28	1089	4.63	1132	4.98	1173	5.33	-
	7,500	1080	4.97	1123	5.34	1164	5.71	-	-	-
	6,000	999	3.53	1045	3.85	1089	4.17	1131	4.50	1172
40RM	7,000	1042	4.37	1086	4.72	1129	5.07	1169	5.43	-
40RMS	8,000	1091	5.37	1133	5.75	1173	6.13	-	-	-
024	9,000	1143	6.54	1183	6.96	-	-	-	-	-
	10,000	1200	7.91	-	-	-	-	-	-	-
	7,500	963	6.83	1021	7.98	1078	9.21	-	-	-
40RM	8,750	972	7.22	1025	8.26	1078	9.38	-	-	-
40RMS	10,000	991	7.91	1040	8.89	1089	9.93	-	-	-
028	11,250	1019	8.89	1064	9.83	-	-	-	-	-
	12,500	1053	10.15	1095	11.05	-	-	-	-	-
	9,000	955	6.98	1008	7.98	1060	9.05	-	-	-
40RM	10,500	978	7.84	1026	8.76	1073	9.74	-	-	-
40RMS	12,000	1011	9.07	1055	9.95	1098	10.88	-	-	-
034	13,500	1052	10.67	1092	11.52	-	-	-	-	-
	15,000	-	-	-	-	-	-	-	-	-

Legend

BHP -Brake Horsepower Input to Fan
ESP -External Static Pressure

Notes:

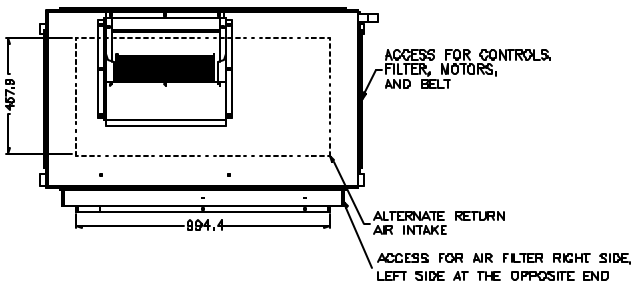
1. Maximum allowable fan speed is 1100 rpm for unit sizes 028 and 034; 1200 for all other sizes.
2. Fan performance is based on deductions for wet coil, clean 2-in. filters, and unit casing. See table for factory-supplied filter pressure drop.

.4
BHP
-
-
-
-
-
1.94
2.25
2.60
-
-
3.70
4.30
4.91
-
-
4.83
-
-
-
-
-
-
-
-
-
-
-
-
-
-

Factory-Supplied Filter Pressure Drop - English

Unit	Airflow (Cfm)	Press. Drop (in. wg.)
40 RM	2,250	0.07
40 RMS	3,000	0.11
008	3,750	0.15
40 RM	3,000	0.11
40 RMS	4,000	0.17
012	5,000	0.23
40 RM	4,500	0.08
40 RMS	6,000	0.12
016	7,500	0.17
40 RM	6,000	0.12
40 RMS	8,000	0.19
024	10,000	0.26
40 RM	7,500	0.15
40 RMS	10,000	0.22
028	12,500	0.30
40 RM	9,000	0.19
40 RMS	12,000	0.29
034	15,000	0.40

40RM008-012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ACCESS FOR CONTROLS, FILTER, MOTORS, AND BELT
894.4
ALTERNATE RETURN AIR INTAKE
ACCESS FOR AIR FILTER RIGHT SIDE, LEFT SIDE AT THE OPPOSITE END

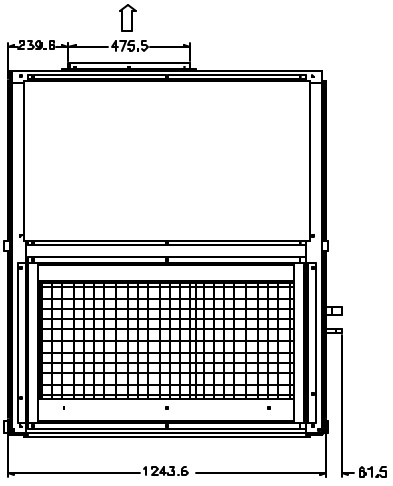
LEGEND:

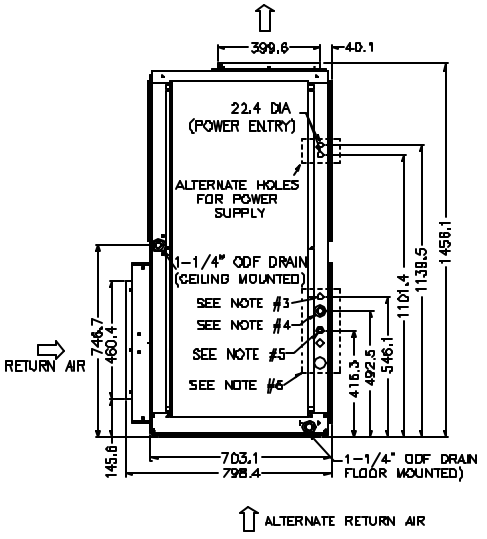
TXV – THERMOSTATIC EXPANSION VALVE

⇨ – DIRECTION OF AIRFLOW

NOTES:

1. DIMENSIONS ARE IN MILLIMETERS.
2. RECOMMENDED CLEARANCE:
   REAR : 3 " (78 mm)
   FRONT : 2' 6" (762 mm)
   LEFT : 2' 6 " (762 mm)
   RIGHT : 2' 6" (762 mm)
3. 22.2 DIA FOR TXV BULB CONNECTION
4. 44.5 DIA FOR SUCTION LINE CONNECTION.
5. 28.6 DIA. FOR LIQUID LINE CONNECTION
6. ALTERNATE ENTRANCE FOR COIL CONNECTION





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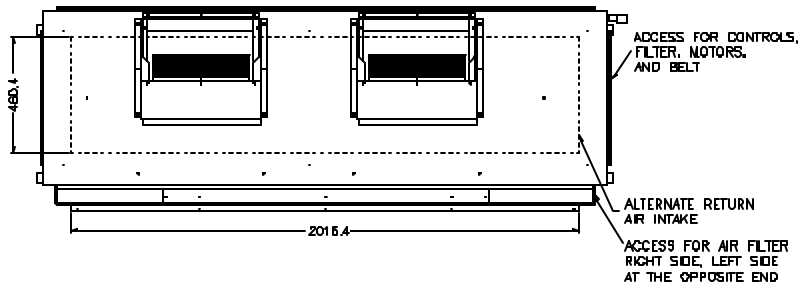
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2015.4
ACCESS FOR CONTROLS, FILTER, MOTORS, AND BELT
ALTERNATE RETURN AIR INTAKE
ACCESS FOR AIR FILTER RIGHT SIDE, LEFT SIDE AT THE OPPOSITE END

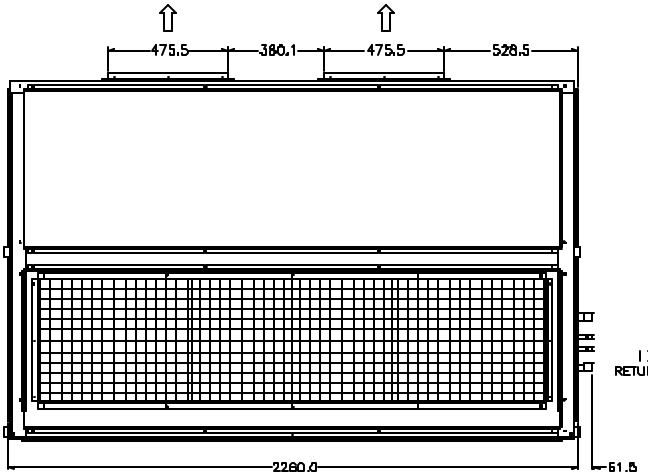
LEGEND:

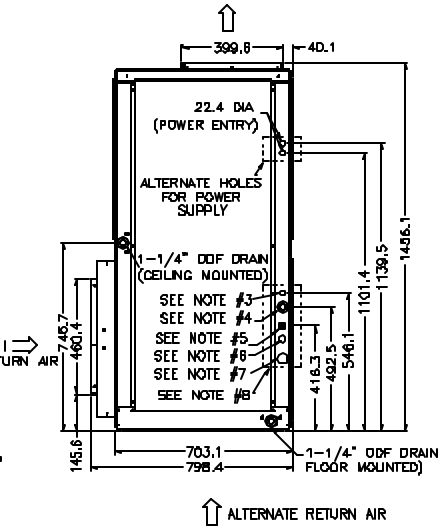
TXV – THERMOSTATIC EXPANSION VALVE

⇨ – DIRECTION OF AIRFLOW

NOTES:

1. DIMENSIONS ARE IN MILLIMETERS.
2. RECOMMENDED CLEARANCE:
   REAR : 3 " (78 mm)
   FRONT : 2' 8" (762 mm)
   LEFT : 2' 6 " (762 mm)
   RIGHT : 2' 8" (762 mm)
3. 22.2 DIA FOR TXV BULB CONNECTION
4. 44.5 DIA FOR SUCTION LINE CONNECTION (UPPER CIRCUIT)
5. 28.6 DIA. FOR LIQUID LINE CONNECTION (UPPER CIRCUIT)
6. 28.6 DIA. FOR LIQUID LINE CONNECTION (LOWER CIRCUIT)
7. 44.5 DIA FOR SUCTION LINE CONNECTION (LOWER CIRCUIT)
8. ALTERNATE ENTRANCE FOR COIL CONNECTION.





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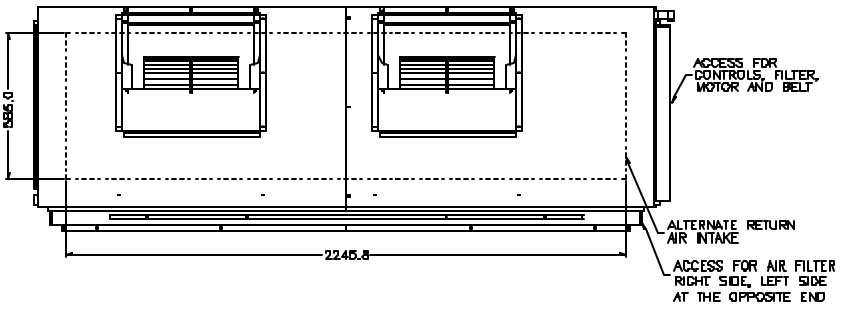
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ACCESS FOR CONTROLS, FILTER, MOTOR AND BELT
ALTERNATE RETURN AIR INTAKE
2245.8
ACCESS FOR AIR FILTER RIGHT SIDE, LEFT SIDE AT THE OPPOSITE END

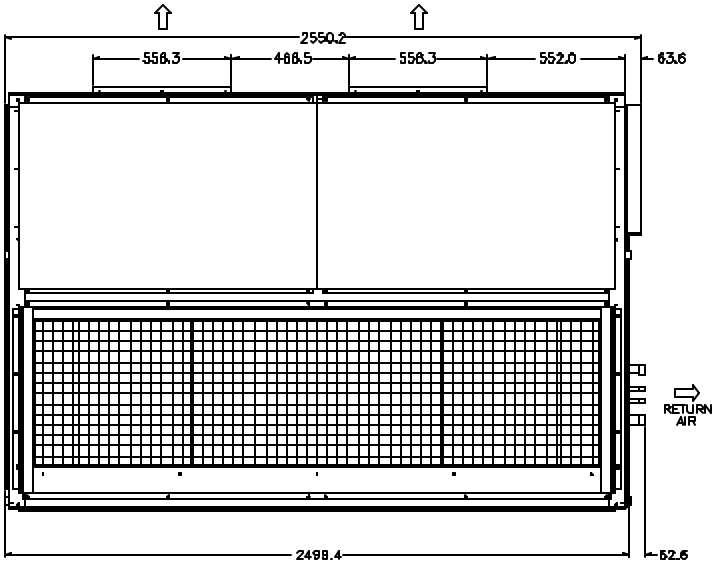
LEGEND:

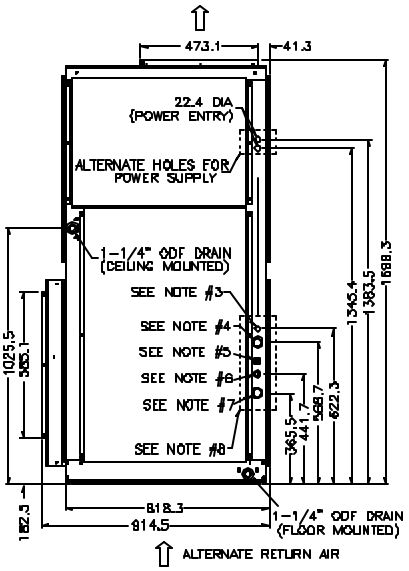
TXV – THERMOSTATIC EXPANSION VALVE

– DIRECTION OF AIRFLOW

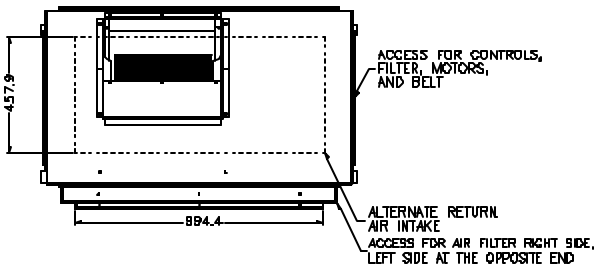
NOTES:

1. DIMENSIONS ARE IN MILLIMETERS.
2. RECOMMENDED CLEARANCE:
   REAR : 3 " (76 mm)
   FRONT : 2' 6" (762 mm)
   LEFT : 2' 6 " (762 mm)
   RIGHT : 2' 6" (762 mm)
3. 22.2 DIA FOR TXV BULB CONNECTION
4. 44.5 DIA FOR SUCTION LINE CONNECTION (UPPER CIRCUIT)
5. 28.6 DIA. FOR LIQUID LINE CONNECTION (UPPER CIRCUIT)
6. 28.6 DIA. FOR LIQUID LINE CONNECTION (LOWER CIRCUIT)
7. 44.5 DIA FOR SUCTION LINE CONNECTION (LOWER CIRCUIT)
8. ALTERNATE ENTRANCE FOR COIL CONNECTION





40RMS008-012

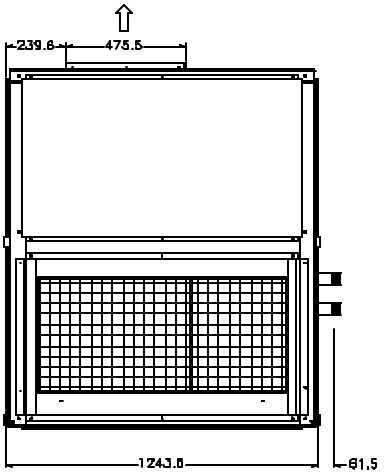

457.9
ACCESS FOR CONTROLS, FILTER, MOTORS, AND BELT
894.4
ALTERNATE RETURN AIR INTAKE
ACCESS FOR AIR FILTER RIGHT SIDE, LEFT SIDE AT THE OPPOSITE END

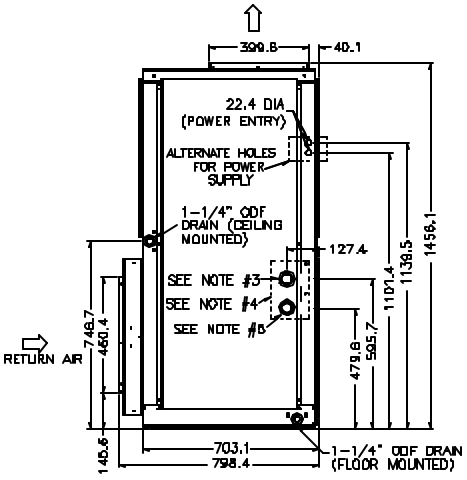
LEGEND:

TXV – THERMOSTATIC EXPANSION VALVE

⇨ – DIRECTION OF AIRFLOW

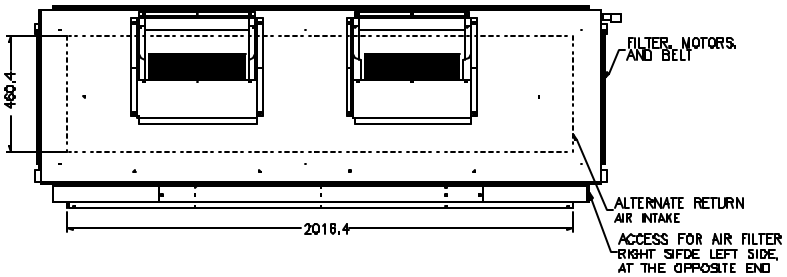
NOTES:
1. DIMENSIONS ARE IN MILLIMETERS.
2. RECOMMENDED CLEARANCE:
   REAR : 3" (76 mm)
   FRONT : 2' 6" (762 mm)
   LEFT : 2' 6" (762 mm)
   RIGHT : 2' 6" (762 mm)
3. 1-1/2" DIA WATER OUTLET CONNECTION
4. ALTERNATE ENTRANCE COIL CONNECTION
5. 1-1/2" DIA WATER SUPPLY CONNECTION





⇧ ALTERNATE RETURN AIR

40RMSD16-024

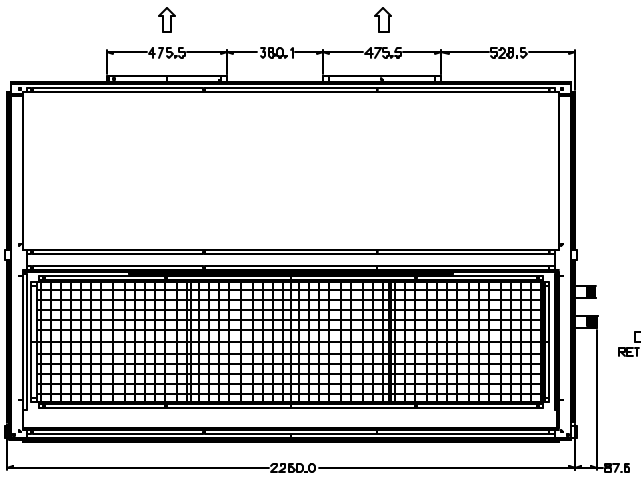

460.4
FILTER, MOTORS, AND BELT
ALTERNATE RETURN AIR INTAKE
2018.4
ACCESS FOR AIR FILTER RIGHT SIDE LEFT SIDE, AT THE OPPOSITE END

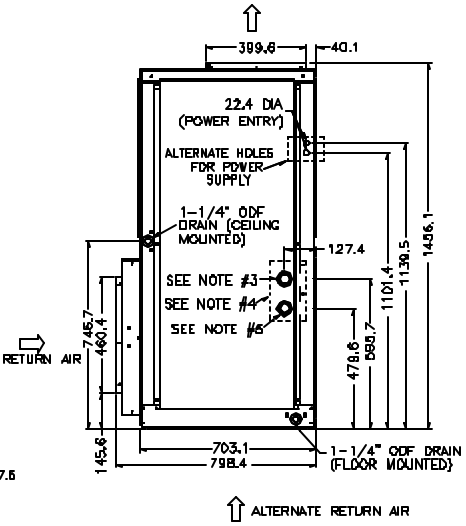
LEGEND:

TXV – THERMOSTATIC EXPANSION VALVE

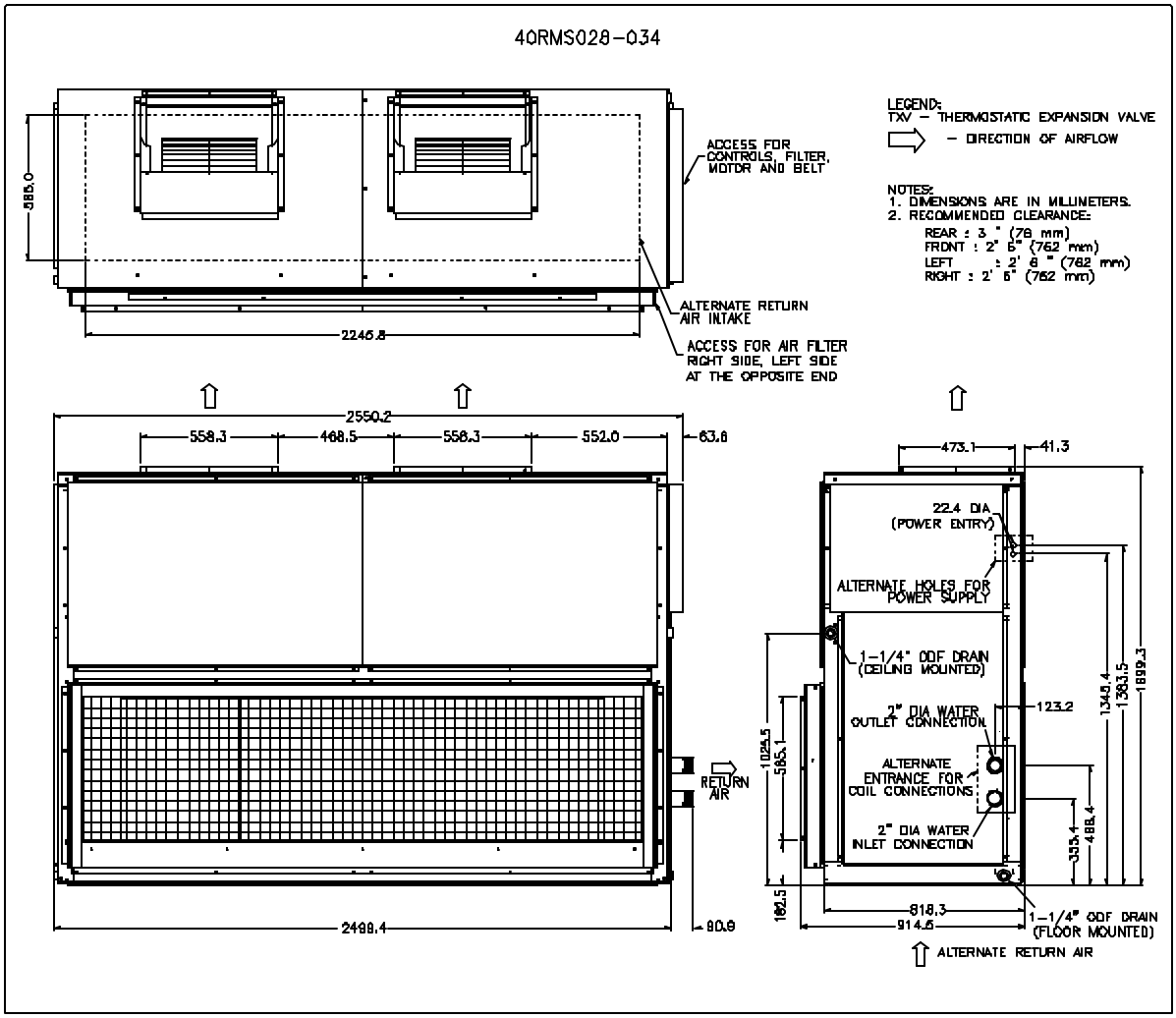
⇨ – DIRECTION OF AIRFLOW

NOTES:
1. DIMENSIONS ARE IN MILLIMETERS.
2. RECOMMENDED CLEARANCE:
   REAR : 3" (78 mm)
   FRONT : 2' 8" (762 mm)
   LEFT : 2' 8" (762 mm)
   RIGHT : 2' 6" (762 mm)
3. 1-1/2" DIA WATER OUTLET CONNECTION
4. ALTERNATE ENTRANCE COIL CONNECTION
5. 1-1/2" DIA WATER SUPPLY CONNECTION





⇧ ALTERNATE RETURN AIR


40RMS028-034
LEGEND:
TXV – THERMOSTATIC EXPANSION VALVE
– DIRECTION OF AIRFLOW
NOTES:
1. DIMENSIONS ARE IN MILLIMETERS.
2. RECOMMENDED CLEARANCE:
REAR : 3 " (76 mm)
FRONT : 2' 6" (762 mm)
LEFT : 2' 6 " (762 mm)
RIGHT : 2' 6" (762 mm)
585.0
2246.8
ACCESS FOR CONTROLS, FILTER, MOTOR AND BELT
ALTERNATE RETURN AIR INTAKE
ACCESS FOR AIR FILTER RIGHT SIDE, LEFT SIDE AT THE OPPOSITE END
2550.2
558.3
468.5
558.3
552.0
63.6
RETURN AIR
2498.4
90.9
473.1
41.3
22.4 DIA (POWER ENTRY)
ALTERNATE HOLES FOR POWER SUPPLY
1-1/4" ODF DRAIN (CEILING MOUNTED)
2" DIA WATER OUTLET CONNECTION
123.2
ALTERNATE ENTRANCE FOR COIL CONNECTIONS
2" DIA WATER INLET CONNECTION
1025.5
585.1
160.5
818.3
914.5
1-1/4" ODF DRAIN (FLOOR MOUNTED)
1348.4
1383.5
1899.3
353.4
488.4
ALTERNATE RETURN AIR

START-UP CHECKLIST
(SPLIT SYSTEMS WITH 40RM/RMS UNITS)

A. Preliminary Information

OUTDOOR: MODEL NO. _____ SERIAL NO: _____

INDOOR : MODEL NO. _____ SERIAL NO: _____

ADDITIONAL ACCESSORIES _____

_____

B. Pre - Start-Up

OUTDOOR UNIT

Is there any shipping damage? (Y/N) _____
If so, where : _____

_____

Will this damage prevent unit start-up? (Y/N) _____
Check power supply. Does it agree with unit? (Y/N) _____
Has the ground wire been connected? (Y/N) _____
Has the circuit protection been sized and installed properly? (Y/N) _____
Are the power wires to the unit sized and installed properly? (Y/N) _____
Have the compressor holddown bolts been loosened? (Y/N) _____

CONTROLS

Are thermostat(s) and indoor fan control wiring connections made and checked? (Y/N) _____
Are all wiring terminals (including main power) tight? (Y/N) _____
Have outdoor unit crankcase heater been energized for 24 hours? (Y/N) _____

INDOOR UNIT

Has water been placed in drain pan to confirm proper drainage? (Y/N) _____
Are proper air filters in place? (Y/N) _____
Have fan motor pulleys been checked for proper alignment? (Y/N) _____
Do fan belts have proper tension? (Y/N) _____

PIPING

40RM
Are liquid solenoid valves located at the indoor unit coils as required? (Y/N) _____
Have leak checks been made at compressors, condensers, indoor coils, thermostatic expansion valves, solenoid valves, filter driers and fusible plugs with a leak detector? (Y/N) _____
Locate, repair, and report leaks.
Have all compressor service valves been fully opened (backseated)? (Y/N) _____
Are the compressor sight glasses showing the correct levels? (Y/N) _____

40RMS
Has air been bled from the system? (Y/N) _____
Have leak checks been made at compressors, chillers, valves and indoor coils? (Y/N) _____
Locate, repair and report any leaks. _____

_____

_____

CHECK VOLTAGE IMBALANCE

Line-to-line Volts AB_____ V AC_____ V BC_____ V
(AB + AC + BC)/3 = Average Voltage = _____ V
Maximum deviation from average voltage = _____ V
Voltage imbalance = 100 x (maximum deviation)/(average voltage) = _____ %

If over 2% voltage imbalance, DO NOT ATTEMPT TO START SYSTEM!
CALL LOCAL POWER COMPANY FOR ASSISTANCE.

C. Start-Up

Check evaporator fan speed and record.
After at least 10 minutes running time, record the following measurements.

	COMP A1	COMP B1
Oil pressure		
Suction Pressure		
Suction Line Temp		
Discharge Pressure		
Discharge Line Temp		
Outdoor Unit Entering Air Temp		
Outdoor Unit Leaving Air Temp		
Indoor Unit Entering Air DB Temp		
Indoor Unit Entering Air WB Temp		
Indoor Unit Leaving Air DB Temp		
Indoor Unit Leaving Air WB Temp		
Outdoor Unit Entering Water Temp (40RMS only)		
Outdoor Unit Leaving Water Temp (40RMS only)		
Indoor Unit Entering Water Temp (40RMS only)		
Indoor Unit Leaving Water Temp (40RMS only)		
Compressor Amps (L1/L2/L3)	____/____/____	____/____/____

Check the compressor oil level sight glasses; Are the glasses showing oil level at 1/8 to 1/3 full?

NOTES: